US EPA ARCHIVE DOCUMENT

chelle A. Luebke and Dr. David S. Leigh
niversity of Georgia, Athens, GA

004 EPA STAR Graduate Fellowship Conference *Next Generation Scientists—Next Opportunities*

US EPA ARCHIVE DOCUMENT

Flow and habitat dynamics associated with entrenched channels

ostract

rder for restoration activities to be successful, nagers need a good understanding of the dynamics erent in a particular system. Entrenchment is a rphological condition which results from disequilibrium quatic systems due to the disconnection of a channel its adjacent floodplain. In the Southeast, this is most cally due to land use practices that eroded historic iment from the hillslopes and caused the channel to rade. As the stream incised through this deposited iment, it became entrenched. These types of streams, ough the focus for widespread restoration efforts, have been quantitatively studied. This study focuses on the amics of entrenched stream reaches and how they ond during baseflow and flood conditions in relation to nnel morphology, streambed composition, and iment transport.

Scientific Approach

- 5 wadeable (<200 km^2) streams-similar veg. and slope
- ~20 transects/reach type (entrenched, non-entrenched)
- placed at EPA habitat types
  - pool, riffle, rapid, glide, cascade, or falls sediment

- terrace – terrace cross-sections, including channel
- Wolman pebble count in reach and 100 in one riffle
- predominant ψ size class in 0.5m diameter
- embededness of bed sediment
- presence/absence of fine sediment drape
- velocity (0.6 depth) in thalweg at each 0.5x bankfull width
- discharge measured at upstream end of reach

Preliminary Results

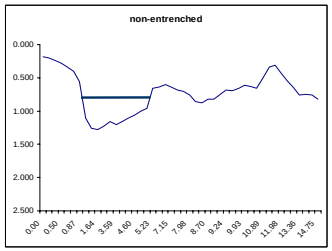

Figure 1: Cross-sectional profile of a sample non-entrenched reach on Coweeta Creek. Notice the water depth and the heterogeneous floodplain on stream right.

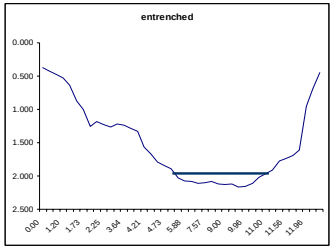

Figure 2: Cross-sectional profile of a sample entrenched reach from Coweeta Creek. Notice the difference in water depth from the non-entrenched reach.

Expected Results

- non-entrenched reaches:
  - heterogeneous channel shape, both laterally and longitudinally
  - larger width/depth ratio and shallower channels
- entrenched reaches:
  - homogeneous channel shape, both laterally and longitudinally
  - prevent most overbank flow
  - more fines? fewer fines?

Expected Significance

- restoration/rehabilitation of aquatic ecosystems are valuable management tools
- better understand sediment and flood dynamics within entrenched reaches
- implications for whole-system functioning, including biotic habitat, sediment composition, and watershed protection
- help link research with practical applications management decisions and restoration

This fellow is sponsored by EPA's STAR or Greater Research Opportunities (GRO) Program.